

### **Abstract of the Disclosure**

Fluid processing apparatus comprises a fluid-handling manifold comprising a manifold body having at least a first fluid duct and a second fluid duct. The first and second fluid ducts are in fluid communication with each other at a microfluidic junction of the fluid-handling manifold. The manifold body further comprises a transducer operative to generate ultrasonic acoustic traveling wave radiation into fluid in the microfluidic junction from an active surface toward a non-reflective boundary of the microfluidic junction. The microfluidic junction is operative to pass fluid received from the first and second duct, with micro-mixing effected by the traveling wave radiated into the junction during the fluid flow.